

摘要

PLC 可编程序控制器: PLC 英文全称 Programmable Logic Controller,中文全称为可编程逻辑控制器,定义是:一种数字运算操作的电子系统,专为在工业环境应用而设计的。它采用一类可编程的存储器,用于其内部存储程序,执行逻辑运算,顺序控制,定时,计数与算术操作等面向用户的指令,并通过数字或模拟式输入/输出控制各种类型的机械或生产过程。

PLC 是基于电子计算机,且适用于工业现场工作的电控制器。它源于继电控制装置,但它不像继电装置那样,通过电路的物理过程实现控制,而主要靠运行存储于 PLC 内存中的程序,进行入出信息变换实现控制。入出信息变换、可靠物理实现,可以说是 PLC 实现控制的两个基本要点。入出信息变换靠运行存储于 PLC 内存中的程序实现。PLC 程序既有生产厂家的系统程序(不可更改),又有用户自行开发的应用(用户)程序。系统程序提供运行平台,同时,还为 PLC 程序可靠运行及信号与信息转换进行必要的公共处理。用户程序由用户按控制要求设计。什么样的控制要求,就应有什么样的用户程序。可靠物理实现主要靠输入(INPUT)及输出(OUTPUT)电路。PLC 的 I/O 电路,都是专门设计的。输入电路要对输入信号进行滤波,以去掉高频干扰。而且与内部计算机电路在电上是隔离的,靠光耦元件建立联系。输出电路内外也是电隔离的,靠光耦元件或输出继电器建立联系。输出电路还要进行功率放大,以足以带动一般的工业控制元器件,如电磁阀、接触器等等。I/O 电路是很多的,每一输入点或输出点都要有一个 I 或 O 电路。PLC 有多 I/O 用点,一般也就有多少个 I/O 用电路。但由于它们都是由高度集成化的电路组成的,所以,所占体积并不大。输入电路时刻监视着输入状况,并将其暂存于输入暂存器中。每一输入点都有一个对应的存储其信息的暂存器。输出电路要把输出锁存器的信息传送给输出点。输出锁存器与输出点也是一一对应的。这里的输入暂存器及输出锁存器实际就是 PLC 处理器 I/O 口的寄存器。它们与计算机内存交换信息通过计算机总线,并主要由运行系统程序实现。把输入暂存器的信息读到 PLC 的内存中,称输入刷新。PLC 内存有专门开辟的存放输入信息的映射区。这个区的每一对应位(bit)称之为输入继电器,或称软接点。这些位置成 1,表示接点通,置成 0 为接点断。由于它的状态是由输入刷新得到的,所以,它反映的就是输入状态。

关键词: 可编程序的逻辑控制器(PLC); 洗衣机; 控制

Abstract PLC programmable controller: PLC English full title Programmable Logic Controller, Chinese full title as the programmable logical controller, the definition is: One kind of digital operation operation's electronic system, for designs specially in the industry environment application. It uses a kind of programmable memory, uses in its internally stored program, the actuating logic operation, the sequential control, fixed time, counting and arithmetic operation and so on face user's instruction, and through digital either simulation type input/output control each type machinery or production process. PLC is based on the electronic accounting machine, and is suitable for the industry field work electric controller. It stems from following the electricity control device, but it does not look like following the electricity installs such, realizes the control through electric circuit's physical process, but mainly saves depending on the movement in the PLC memory the procedure, carries on into the information conversion to realize the control. Enters the information conversion, the reliable physics to realize, may say that is PLC realizes the control two essential points. Enters the information conversion to save depending on the movement in the PLC memory the procedure realizes. The PLC procedure both has the Manufacturers system program (not to be possible change), and has the application which the user develops voluntarily (user) the procedure. The system program provides the movement platform, simultaneously, but is also the PLC procedure reliability service and the signal and the information transformation carries on essential public processing. The user program according to controls the request design by the user. What control request, should have what user program.

The reliable physics realizes mainly depending on loses the human (INPUT) and the output (OUTPUT)

the electric circuit. The PLC I/O electric circuit, is designs specially. The input circuit must carry on the filter to the input signal, removes the high frequency interference. Moreover is isolates with the internal computer electric circuit on the electricity, depending on light pair part establish contact. Inside and outside the output circuit is also the electricity isolation, depending on light pair part or output relay establish contact. The output circuits must carry on the power amplification, by drives the general industrial control primary device sufficiently, like solenoid valve, contact device and so on. The I/O electric circuit is many, each entrance point either output must have one I or the O electric circuit. PLC has multi-I/O to use the spot, generally also has how many I/O to use the electric circuit. But because they are composed highly by the integrated electric circuit, therefore, accounts for the volume not to be big. The input circuit time monitors is inputting the condition, and its interim in input temporary storage device.

Each entrance point has a corresponding memory its information temporary storage device. The output circuit must output latch's information transmission for the output spot. Outputs the latch and output is also 1:1 correspondences. Here input temporary storage device and the output latch are actually PLC the processor I/O mouth register. They with the computer memory exchange information through the computer mainline, and mainly realize by the run-time system procedure. Lose the person temporary storage device's information to read PLC in the memory, calls input refurbishing. In PLC has specially the opening depositing in fed information mapping area. This area's each corresponding position (bit) called it inputs the relay, or call the soft contact. These positions become 1, indicates the contact to pass, sets 0 breaks for the contact. Because its condition is obtains by input refurbishing, therefore, it reflects is the input state.

Key words: programmable logic controller (PLC); industrial washing machine; Control

目 录

Abstract	2
第一章 三菱 FX 系列 PLC 简介	6
1.1 PLC 的定义	6
1.2 PLC 的特点	7
1.3 PLC 的结构和工作原理	7
1.4 PLC 与其他工业控制的比较	8
1.5 FX 系列 PLC 的特点	9
第二章 全自动洗衣机 PLC 控制	12
2.1 任务介绍	12
2.1.1. 课题名称	12
2.1.2. 工艺要求及动作流程	12
2.2 控制要求	13
第三章 全自动洗衣机控制方案	14
3.1 设计方案比较	14
3.2 PLC I/O 模块的选择步骤与原则	15
3.2.1 开关量 I / O 模块的选择	15
3.2.2 模拟量 I / O 模块的选择	17
3.3 I/O 口及定时器/计数器说明	17
3.4 I/O 口分配表	18
3.5 硬件接线图	19
3.5.1 主电机接线电路图	19
3.5.2 PLC 硬件连接线路图	19

3.5.3 设计功能顺序.....	20
3.6 洗衣机 PLC 控制梯形图	21
3.7 指令表	23
第四章 全自动洗衣机控制简介	16
4.1 功能简介	16
4.2 PLC 程序控制步骤	18
4.3 控制实验仿真	19
第五章 设计总结	21
致 谢	22
参考文献	23
附录 1: 总接线图	24
附录 2 洗衣机总程序	25